

§111.15. Mathematics, Grade 3.

(a) Introduction.

- (1) Within a well-balanced mathematics curriculum, the primary focal points at Grade 3 are multiplying and dividing whole numbers, connecting fraction symbols to fractional quantities, and standardizing language and procedures in geometry and measurement.
 - (2) Throughout mathematics in Grades 3-5, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use algorithms for addition, subtraction, multiplication, and division as generalizations connected to concrete experiences; and they concretely develop basic concepts of fractions and decimals. Students use appropriate language and organizational structures such as tables and charts to represent and communicate relationships, make predictions, and solve problems. Students select and use formal language to describe their reasoning as they identify, compare, and classify two- or three-dimensional geometric figures; and they use numbers, standard units, and measurement tools to describe and compare objects, make estimates, and solve application problems. Students organize data, choose an appropriate method to display the data, and interpret the data to make decisions and predictions and solve problems.
 - (3) Throughout mathematics in Grades 3-5, students develop numerical fluency with conceptual understanding and computational accuracy. Students in Grades 3-5 use knowledge of the base-ten place value system to compose and decompose numbers in order to solve problems requiring precision, estimation, and reasonableness. By the end of Grade 5, students know basic addition, subtraction, multiplication, and division facts and are using them to work flexibly, efficiently, and accurately with numbers during addition, subtraction, multiplication, and division computation.
 - (4) Problem solving, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Grades 3-5, students use these processes together with technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve meaningful problems as they do mathematics.
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(b) Knowledge and skills.

- (3.1) **Number, operation, and quantitative reasoning.** The student uses place value to communicate about increasingly large whole numbers in verbal and written form, including money.

The student is expected to:

- (A) use place value to read, write (in symbols and words), and describe the value of whole numbers through 999,999;
- (B) use place value to compare and order whole numbers through 9,999; and
- (C) determine the value of a collection of coins and bills.

- (3.2) **Number, operation, and quantitative reasoning.** The student uses fraction names and symbols (with denominators of 12 or less) to describe fractional parts of whole objects or sets of objects.

The student is expected to:

- (A) construct concrete models of fractions;
- (B) compare fractional parts of whole objects or sets of objects in a problem situation using concrete models;
- (C) use fraction names and symbols to describe fractional parts of whole objects or sets of objects; and
- (D) construct concrete models of equivalent fractions for fractional parts of whole objects.

- (3.3) **Number, operation, and quantitative reasoning.** The student adds and subtracts to solve meaningful problems involving whole numbers.

The student is expected to:

- (A) model addition and subtraction using pictures, words, and numbers; and
- (B) select addition or subtraction and use the operation to solve problems involving whole numbers through 999.

- (3.4) **Number, operation, and quantitative reasoning.** The student recognizes and solves problems in multiplication and division situations.

The student is expected to:

- (A) learn and apply multiplication facts through 12 by 12 using concrete models and objects;
- (B) solve and record multiplication problems (up to two digits times one digit); and
- (C) use models to solve division problems and use number sentences to record the solutions.

- (3.5) **Number, operation, and quantitative reasoning.** The student estimates to determine reasonable results.

The student is expected to:

- (A) round whole numbers to the nearest ten or hundred to approximate reasonable results in problem situations; and
- (B) use strategies including rounding and compatible numbers to estimate solutions to addition and subtraction problems.

- (3.6) **Patterns, relationships, and algebraic thinking.** The student uses patterns to solve problems.

The student is expected to:

- (A) identify and extend whole-number and geometric patterns to make predictions and solve problems;
- (B) identify patterns in multiplication facts using concrete objects, pictorial models, or technology; and
- (C) identify patterns in related multiplication and division sentences (fact families) such as $2 \times 3 = 6$, $3 \times 2 = 6$, $6 \div 2 = 3$, $6 \div 3 = 2$.

- (3.7) **Patterns, relationships, and algebraic thinking.** The student uses lists, tables, and charts to express patterns and relationships.

The student is expected to:

- (A) generate a table of paired numbers based on a real-life situation such as insects and legs; and
- (B) identify and describe patterns in a table of related number pairs based on a meaningful problem and extend the table.

- (3.8) **Geometry and spatial reasoning.** The student uses formal geometric vocabulary.
- The student is expected to identify, classify, and describe two- and three-dimensional geometric figures by their attributes. The student compares two-dimensional figures, three-dimensional figures, or both by their attributes using formal geometry vocabulary.
- (3.9) **Geometry and spatial reasoning.** The student recognizes congruence and symmetry.
- The student is expected to:
- (A) identify congruent two-dimensional figures;
 - (B) create two-dimensional figures with lines of symmetry using concrete models and technology; and
 - (C) identify lines of symmetry in two-dimensional geometric figures.
- (3.10) **Geometry and spatial reasoning.** The student recognizes that a line can be used to represent numbers and fractions and their properties and relationships.
- The student is expected to locate and name points on a number line using whole numbers and fractions, including halves and fourths.
- (3.11) **Measurement.** The student directly compares the attributes of length, area, weight/mass, and capacity, and uses comparative language to solve problems and answer questions. The student selects and uses standard units to describe length, area, capacity/volume, and weight/mass.
- The student is expected to:
- (A) use linear measurement tools to estimate and measure lengths using standard units;
 - (B) use standard units to find the perimeter of a shape;
 - (C) use concrete and pictorial models of square units to determine the area of two-dimensional surfaces;
 - (D) identify concrete models that approximate standard units of weight/mass and use them to measure weight/mass;
 - (E) identify concrete models that approximate standard units for capacity and use them to measure capacity; and
 - (F) use concrete models that approximate cubic units to determine the volume of a given container or other three-dimensional geometric figure.
- (3.12) **Measurement.** The student reads and writes time and measures temperature in degrees Fahrenheit to solve problems.
- The student is expected to:
- (A) use a thermometer to measure temperature; and
 - (B) tell and write time shown on analog and digital clocks.

(3.13) **Probability and statistics.**

The student solves problems by collecting, organizing, displaying, and interpreting sets of data.

The student is expected to:

- (A) collect, organize, record, and display data in pictographs and bar graphs where each picture or cell might represent more than one piece of data;
- (B) interpret information from pictographs and bar graphs; and
- (C) use data to describe events as more likely than, less likely than, or equally likely as.

(3.14) **Underlying processes and mathematical tools.**

The student applies Grade 3 mathematics to solve problems connected to everyday experiences and activities in and outside of school.

The student is expected to:

- (A) identify the mathematics in everyday situations;
- (B) solve problems that incorporate understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;
- (C) select or develop an appropriate problem-solving plan or strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem; and
- (D) use tools such as real objects, manipulatives, and technology to solve problems.

(3.15) **Underlying processes and mathematical tools.**

The student communicates about Grade 3 mathematics using informal language.

The student is expected to:

- (A) explain and record observations using objects, words, pictures, numbers, and technology; and
- (B) relate informal language to mathematical language and symbols.

(3.16) **Underlying processes and mathematical tools.**

The student uses logical reasoning.

The student is expected to:

- (A) make generalizations from patterns or sets of examples and nonexamples; and
- (B) justify why an answer is reasonable and explain the solution process.